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NOTICE OF ALLOWANCE AND FEE(S) DUE

26200 7590 08/18/2008

FISH & RICHARDSON P.C.
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER

PHU, SANH D

ART UNIT

PAPER NUMBER

2618

DATE MAILED: 08/18/2008

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/762,153	01/20/2004	Xiaopeng Chen	MP0417/13361-070001	4951

TITLE OF INVENTION: METHOD AND APPARATUS FOR REDUCING ECHO AND CROSSTALK IN A COMMUNICATION SYSTEM

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1440	\$0	\$0	\$1440	11/18/2008

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. **PROSECUTION ON THE MERITS IS CLOSED.** THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN **THREE MONTHS** FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. **THIS STATUTORY PERIOD CANNOT BE EXTENDED.** SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail** **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax **(571)-273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

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Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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nonprovisional	NO	\$1440	\$0	\$0	\$1440	11/18/2008

EXAMINER	ART UNIT	CLASS-SUBCLASS
PHU, SANH D	2618	370-352000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB-122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB-47; Rev 03-02 or more recent) attached. Use of a **Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____
 (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____
 3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY AND STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
☐ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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26200	7590	08/18/2008	EXAMINER	
FISH & RICHARDSON P.C. P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022			PHU, SANH D	
			ART UNIT	PAPER NUMBER

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Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 588 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 588 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Notice of Allowability**Application No.**

10/762,153

Applicant(s)

CHEN ET AL.

Examiner

/Sanh D. Phu/

Art Unit

2618

- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the Amendment filed on 6/24/2008.
2. ☒ The allowed claim(s) is/are 1,2,4-13,16-21,23-32,34-43,45-52,54,56 and 58-72.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
(a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
(b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date 5/31/05; 6/6/06
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____.
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

1. This Office Action is responsive to the Amendment filed on 6/24/2008.

REASONS FOR ALLOWANCE

2. Claims 1-2, 4-13, 16-21, 23-32, 34-43, 45-52, 54, 56, 58-72 are allowed.
3. The following is an examiner's statement of reasons for allowance:

Claims 1-2, 4-13, 16-21, 23-32, 34-43, 45-52, 54, 56, 58-72 are allowable over the prior art of record for the reason as stated in the Applicant's Remark dated on 6/24/2008 pages 16-19 and the reasons as below:

Regarding to claim 1, none of the prior art of record teaches or suggests A transceiver comprising: a digital compensation circuit to generate a digital replica of the interference signal contained in an analog communication signal; a converter to convert the digital replica of the interference signal into a corresponding analog replica of the interference signal; and a subtraction circuit to subtract the analog replica of the interference signal from the analog communication signal, wherein the digital compensation circuit includes a near-end crosstalk (NEXT) canceller to generate a digital replica of a NEXT interference signal in the analog communication signal; wherein the digital compensation circuit further: determines cancellation coefficients that model an impulse response of the interference signal; and multiplies the cancellation coefficients with a communication signal from a transmitter that causes the interference signal. It would not have been obvious for a person skilled in the art to combine other prior arts of record in order to arrive at the claimed invention.

Regarding to claim 12, none of the prior art of record teaches or suggests a method for reducing interference signals in an analog communication signal, the method comprising: generating a digital replica of the interference signal contained in an analog communication signal; converting the digital replica of the interference signal into a corresponding analog replica of the interference signal; and subtracting the analog replica of the interference signal from the analog communication signal to substantially cancel the interference signal from the analog communication signal, wherein the interference signal includes a NEXT interference signal, and wherein generating a digital replica of the interference signal includes: determining cancellation coefficients that model an impulse response of the interference signal; and multiplying the cancellation coefficients with a communication signal from a transmitter that causes the interference signal. It would not have been obvious for a person skilled in the art to combine other prior arts of record in order to arrive at the claimed invention.

Regarding to claim 20, none of the prior art of record teaches or suggests a transceiver comprising: generating means for generating a digital replica of the interference signal contained in an analog communication signal; converting means for converting the digital replica of the interference signal into a corresponding analog replica of the interference signal; and subtracting means for subtracting the analog replica of the interference signal from the analog communication signal to substantially cancel the interference signal from the analog communication signal, wherein the generating means includes means for generating a digital replica of a NEXT interference signal in the analog communication signal, and wherein the generating

means further: determines cancellation coefficients that model an impulse response of the interference signal; and multiplies the cancellation coefficients with a communication signal from a transmitter that causes the interference signal. It would not have been obvious for a person skilled in the art to combine other prior arts of record in order to arrive at the claimed invention.

Regarding to claim 31, none of the prior art of record teaches or suggests a network device in a communication system, the network device comprising: transceiver, the transceiver including, a digital compensation circuit to generate a digital replica of the interference signal contained in an analog communication signal; a converter to convert the digital replica of the interference signal into a corresponding analog replica of the interference signal; and a subtraction circuit to subtract the analog replica of the interference signal from the analog communication signal, wherein the digital compensation circuit includes a NEXT canceller to generate a digital replica of a NEXT interference signal in the analog communication signal, and wherein the digital compensation circuit further: determines cancellation coefficients that model an impulse response of the interference signal; and multiplies the cancellation coefficients with a communication signal from a transmitter that causes the interference signal. It would not have been obvious for a person skilled in the art to combine other prior arts of record in order to arrive at the claimed invention.

Regarding to claim 42, none of the prior art of record teaches or suggests a network device in a communication system, the network device comprising:

communication means, the communication means including, generating means for generating a digital replica of the interference signal contained in an analog communication signal; converting means for converting the digital replica of the interference signal into a corresponding analog replica of the interference signal; and subtracting means for subtracting the analog replica of the interference signal from the analog communication signal to substantially cancel the interference signal from the analog communication signal, wherein the generating means includes means for generating a digital replica of a NEXT interference signal in the analog communication signal, and wherein the generating means further: determines cancellation coefficients that model an impulse response of the interference signal; and multiplies the cancellation coefficients with a communication signal from a transmitter that causes the interference signal. It would not have been obvious for a person skilled in the art to combine other prior arts of record in order to arrive at the claimed invention.

Regarding to claim 54, none of the prior art of record teaches or suggests a cancellation system for use in a communication system including a communication line, the communication line having a transmitter and a receiver at each end, the cancellation system to reduce interference signals in an analog communication signal received by a receiver, the cancellation system comprising: a NEXT canceller, the NEXT canceller operable to generate a digital replica NEXT interference signal ; a converter to convert the digital replica of the NEXT interference signal into a corresponding analog replica of the NEXT interference signal; and a subtracter to subtract the replica NEXT interference signal from an analog communication signal received by the receiver; wherein the

NEXT canceller is further operable to: determine cancellation coefficients that model an impulse response of an interference signal; and multiply the cancellation coefficients with a communication signal from the transmitter. It would not have been obvious for a person skilled in the art to combine other prior arts of record in order to arrive at the claimed invention.

Regarding to claim 56, none of the prior art of record teaches or suggests a cancellation system for use in a communication system including a communication line, the communication line having a transmitter and a receiver at each end, the cancellation system to reduce interference signals in an analog communication signal received by a receiver, the cancellation system comprising: NEXT cancellation means, the NEXT cancellation means for generating a digital replica NEXT interference signal based on the transmitted signal; converting means for converting the digital replica of the NEXT interference signal into a corresponding analog replica of the NEXT interference signal; and subtracting means for subtracting the replica NEXT interference signal from an analog communication signal received by the receiver~ and wherein the NEXT cancellation means further: determines cancellation coefficients that model an impulse response of an interference signal; and multiplies the cancellation coefficients with a communication signal from the transmitter. It would not have been obvious for a person skilled in the art to combine other prior arts of record in order to arrive at the claimed invention.

Regarding to claim 58, none of the prior art of record teaches or suggests a method for reducing interference signals in an analog communication signal received by

a receiver of a communication line, the method comprising: generating a digital replica NEXT interference signal based on the transmitted signal; converting the digital replica of the NEXT interference signal into a corresponding analog replica of the NEXT interference signal; and subtracting the replica NEXT interference signal from an analog communication signal received by the receiver; and wherein generating a digital replica NEXT interference signal includes: determining cancellation coefficients that model an impulse response of an interference signal; and multiplying the cancellation coefficients with a communication signal from the transmitter. It would not have been obvious for a person skilled in the art to combine other prior arts of record in order to arrive at the claimed invention.

Regarding to claim 59, none of the prior art of record teaches or suggests a transceiver comprising: a receiver to receive an analog communication signal, the analog communication signal containing a plurality of interference signals; a digital compensation circuit to generate a digital replica of each interference signal contained in the analog communication signal; a combiner to combine each digital replica to generate a combined digital replica; a converter to convert the combined digital replica into a corresponding analog replica of the interference signal; and a subtraction circuit to subtract the analog replica from the analog communication signal; wherein the digital compensation circuit further: determines cancellation coefficients that model an impulse response of an interference signal; and multiplies the cancellation coefficients with a communication signal from a transmitter. It would not have been obvious for a person

skilled in the art to combine other prior arts of record in order to arrive at the claimed invention.

Regarding to claim 60, none of the prior art of record teaches or suggests a method for reducing interference signals in an analog communication signal, the method comprising: receiving an analog communication signal through a receiver, the analog communication signal containing a plurality of interference signals; generating a digital replica of each interference signal contained in the analog communication signal; combining the digital replica of each interference signal to generate a combined digital replica; converting the combined digital replica into a corresponding analog replica of the interference signal; and subtracting the analog replica from the analog communication signal to substantially cancel each interference signal from the analog communication signal; wherein generating a digital replica of each interference signal includes: determining cancellation coefficients that model an impulse response of an interference signal; and multiplying the cancellation coefficients with a communication signal from a transmitter. It would not have been obvious for a person skilled in the art to combine other prior arts of record in order to arrive at the claimed invention.

Regarding to claim 61, none of the prior art of record teaches or suggests a network device in a communication system, the network device comprising: a transceiver operable to receive an analog communication signal containing a plurality of interference signals, the transceiver including, a receiver to receive the analog communication signal; a digital compensation circuit to generate a digital replica of each interference signal contained in the analog communication signal; a combiner to

combine the digital replica of each interference signal to generate a combined digital replica; a converter to convert the combined digital replica into a corresponding analog replica of the interference signal; and a subtraction circuit to subtract the analog replica of the interference signal from the analog communication signal; wherein the digital compensation circuit further: determines cancellation coefficients that model an impulse response of an interference signal; and multiplying the cancellation coefficients with a communication signal from a transmitter. It would not have been obvious for a person skilled in the art to combine other prior arts of record in order to arrive at the claimed invention.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sanh D. Phu whose telephone number is (571)272-7857. The examiner can normally be reached on M-Fr from 8:00-16:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nay Maung can be reached on (571) 272-7882. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Sanh D Phu/
Primary Examiner
Art Unit 2618